REMARKS

Applicant requests favorable reconsideration and allowance of the subject application in view of the preceding amendments and the following remarks.

Claims 27-50 are presented for consideration in lieu of claims 1-26, which have been canceled without prejudice or disclaimer. Claims 27, 36 and 47-50 are independent. Support for these claims can be found in the application, as originally filed. Therefore, no new matter has been added.

In one aspect of the invention, independent claim 27 recites an apparatus adapted for determining a target position of a stage on which an object is placed. The apparatus includes an image sensing system arranged to obtain image data by sensing an image of a mark formed on the object, a measurement system arranged to measure a position of the stage plural times during the sensing by the image sensing system, and an arithmetic section arranged to calculate the target position of the stage based on the image data obtained by the image sensing system and the positions of the stage measured by the measurement system.

In another aspect of the invention, independent claim 36 recites an exposure apparatus that includes, among other features, first and second measurement systems and a calculation section arranged to calculate a target position of the stage based on a measurement result by the first measurement system and measurement results by the second measurement system.

In still another aspect of the invention, independent claim 47 recites a method adapted for determining a target position of a stage on which an object is placed. The method includes steps of first measuring a position of a mark formed on the object, second measuring a position of the

stage plural times during the measurement in the first measuring step and calculating a target position of the stage based on a measurement result in the first measuring step and measurement results in the second measuring step.

In yet another aspect of the invention, independent claim 48 recites a method adapted for an exposure apparatus having a stage on which a substrate is placed and a lens section adapted to project a pattern onto the substrate. The method includes, among other features, first and second measuring steps and calculating a target position of the stage based on a measurement result in the first measuring step and measurement results in the second measuring step.

In yet another aspect of the invention, independent claim 49 recites a method of manufacturing a device using an exposure apparatus having a stage on which a substrate is placed, and a lens section adapted to project a pattern onto the substrate. The method includes, among other features, first and second measuring steps and calculating a target position of the stage based on a measurement result in the first measuring step and measurement results in the second measuring step.

In still another aspect of the invention, independent claim 50 recites an apparatus adapted for determining a target position of a stage on which an object is placed. The apparatus includes a first measurement system arranged to measure a position of a mark formed on the object, a second measurement system arranged to measure a position of the stage plural times during the measurement by the first measurement system and a calculation section arranged to calculate a target position of the stage based on a measurement result by the first measurement system and measurement results by the second measurement system.

Accordingly, the present invention recited in the independent claims provides the ability to calculate a target position of a stage based on image data obtained by, for example, sensing an image of a mark formed on an object and stage positions measured plural times during the sensing of the image of the mark.

By way of example, and not limitation, the subject disclosure describes, for example, at page 18, line 5, through page 23, line 7, such aspects of the present invention. Specifically, an image sensing control section 300 obtains a shift amount of a mark from a target position based on an image signal sensed by an image sensing section 700 during an observation period. The image signal may contain swing information due to the vibration of the moving stage. Thus, the image signal represents an average of images of the swinging mark during the observation period, and the average mark position can be obtained from this average of the images. A stage deviation storage section 400 can obtain position deviation data of the stage 900 during the observation period, during which the image of the mark is sensed and calculates the average of positional deviations of the stage. A shift amount calculation section 500 can then correct the average mark position based on the average deviation of the stage and calculate the actual shift amount of the mark from the target position.

Applicant submits that the cited art does not teach or suggest such features of the present invention as recited in the independent claims.

Claims 1-26 were rejected under various statutory bases as being unpatentable over U.S. Patent No. 5,760,878 to Ogushi, in the Office Action dated December 17, 2002. These rejections are respectfully traversed.

Figure 7 of the Ogushi patent shows an exposure apparatus that has a laser distance measuring device 106 for detecting a position of an X-Y stage 101 and pickups 504 for detecting a positional deviation between reticle 502 and wafer 103. Applicant submits, however, that both the laser distance measuring device 106 and the pickups 504 are merely used for error shot discrimination. Thus, the device in that patent is not configured to calculate a mark position of a wafer or a target position of a stage by using both the laser distance measuring device 106 and the pickups 504. Accordingly, Applicant submits that the Ogushi patent fails to teach or suggest calculating a target position of a stage based on image data sensed by the pickups 504 and positions of the stage measured, during the sensing by the pickups 504, by the laser distance measuring device 106. Applicant submits, therefore, that the Ogushi patent does not teach or suggest the salient features of Applicant's present invention as recited in the independent claims.

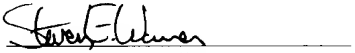
For the foregoing reasons, Applicant submits that the present invention, as recited in independent claims 27, 36 and 47-50, is patentably defined over the cited art.

Dependent claims 28-35 and 37-46 also should be deemed allowable, in their own right, for defining other patentable features of the present invention in addition to those recited in their respective independent claims. Further individual consideration of these dependent claims is requested.

Applicant further submits that the instant application is in condition for allowance. Favorable reconsideration, withdrawal of the objection and rejections set forth in the above-noted Office Action and an early Notice of Allowance are requested.

Applicant's undersigned attorney may be reached in our Washington, D.C. office by telephone at (202) 530-1010. All correspondence should be directed to our address listed below.

Respectfully submitted,



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